

2011 Update to Crested wheatgrass control and monitoring Benton Lake Refuge

Service Unit: Benton Lake NWR
Reporting Office: Benton Lake Complex
Species or group: Upland habitat - invasives
Title: Crested wheatgrass control and monitoring
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This is a summary for 2011 – for full details on the study please see the 2008 report.

I. Materials and Methods

A pilot program to begin testing treatment effectiveness was started in 2008. One management unit of the refuge was chosen to treat established stands and pioneer CWG (Figure 1).

Pioneers

No treatments of pioneer plants occurred in 2011.

Established Stands

Fortunately, at Benton Lake, much of the established CWG infestations are adjacent to road-sides. In the pilot area, the established CWG stands were evenly divided into 9 subplots of approximately 1 acre each. We divided the 9 plots into blocks of 3 subplots each from north to south and then randomly assigned one subplot in each block of three to either a mowing treatment, herbicide treatment or no treatment (control) (Figure 1).

Mowed subplots

We mowed CWG at the four leaf stage, just prior to seed head emergence, in June (06-17-11). All plots were mowed with the bat-wing mower on the back of the tractor. This is the fourth year of mowing and despite above average precipitation, a second mowing was not necessary because the CWG plants never set seed a second time.

Herbicide subplots

No additional treatments occurred in these plots in 2011.

Monitoring

Pioneer plants

We revisited 36 pioneer plants that were treated in 2008-2010.

Established stands

To monitor the effectiveness of these treatments we randomly established two 20m x 0.1m belt transects centered on, and perpendicular to, the invasion front for each subplot (Grant et al 2004). Each 0.5 x 0.1m section of the belt transect was assigned to one of three categories based on dominant vegetation (>50%): (1) native, (2) crested wheatgrass (3) other. From these we will be able to detect the spread of CWG into native prairie and/or the spread of native prairie back into the prior CWG stand. Percent cover of natives and CWG were estimated at the 0, 5, 10, 15 and 19m points along the belt transect using 1 x 0.5m frame (Daubenmire 1959). Data was collected in 2011 just prior to treatment.

II. Results

Pioneer plants

In 2011, 20 of the 36 pioneer plants were confirmed dead.

Established stands

The community-level composition data for the belt transects placed at the CWG invasion front is shown in Figure 3. In the control plots, the percent native increased by 8%. In the mowed and herbicide treated plots, the percent native decreased by 7%. Other vegetation community types detected on the transects include bareground (predominantly on the herbicide treated - CWG side) and Japanese brome (predominantly on the native prairie side).

Percent cover measured in the smaller frames is shown in Figure 4. The frame at 10m is approximately at the invasion front. As expected, the frames outside the CWG stand (0m, 5m) had primarily native and those within the stand (15m, 19m) had primarily CWG. The percent of native cover increased in all treatments since 2008, but the largest increase was in the mowed plots since 2008.

III. Discussion

We continue to learn about treating crested wheatgrass and restoring native prairie. The native seeding seems to be slow to “take” in the herbicide treated plots. The number of native plants appeared to increase after monitoring occurred, so perhaps monitoring in 2012 will indicated better success. According to feedback from refuge staff, up to 3 years post seeding may be necessary to fairly evaluate success.

Mowing continues to be effective at preventing seed formation. We have had good precipitation the last couple of years which may be mitigating some of the stress we hoped to be placing on the CWG plants. It is interesting that at the invasion front, native species seem to be increasing over CWG.

It may be that an effective future treatment will be 3 years of mowing to clean up the seed bank, follow up with 1-2 years of herbicide treatment and then seeding with native species.

We decided to wait at least one more year and evaluate the herbicide/seeded plots before proceeding with any changes to treatments on the mowed or control plots.

Plans for 2012

Treat surviving CWG plants in the herbicide plots.

Repeat mowing in the "mow" plots.

Continue monitoring transects along the invasion front.

IV. Literature citations

Daubenmire, R. 1959. Canopy-coverage method of vegetational analysis. Northwest Science 33:43-64.

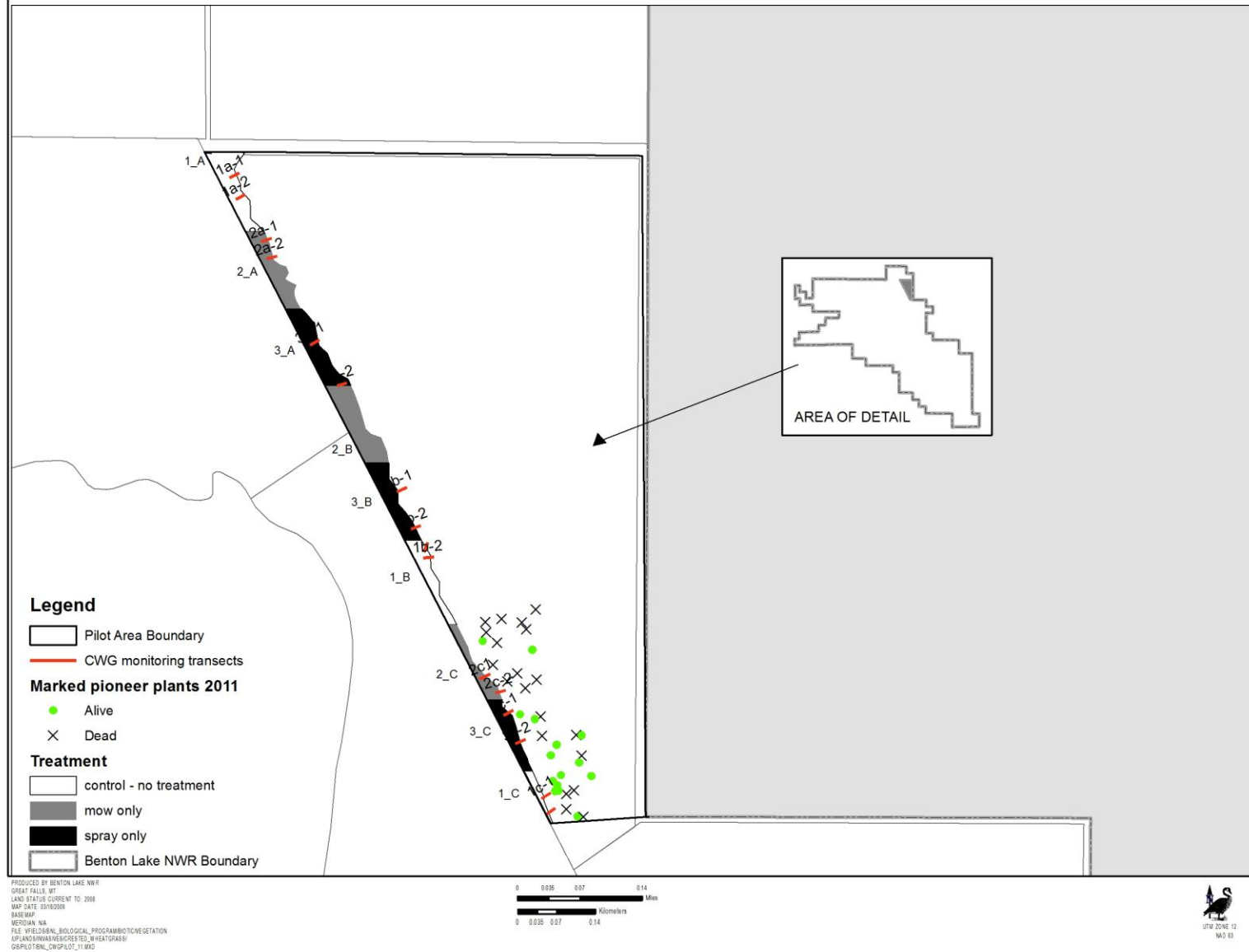
Grant, TA, EM Madden, RK Murphy, KA Smith and MP Nenneman. 2004. Ecological restoration. 22(2):106-112.



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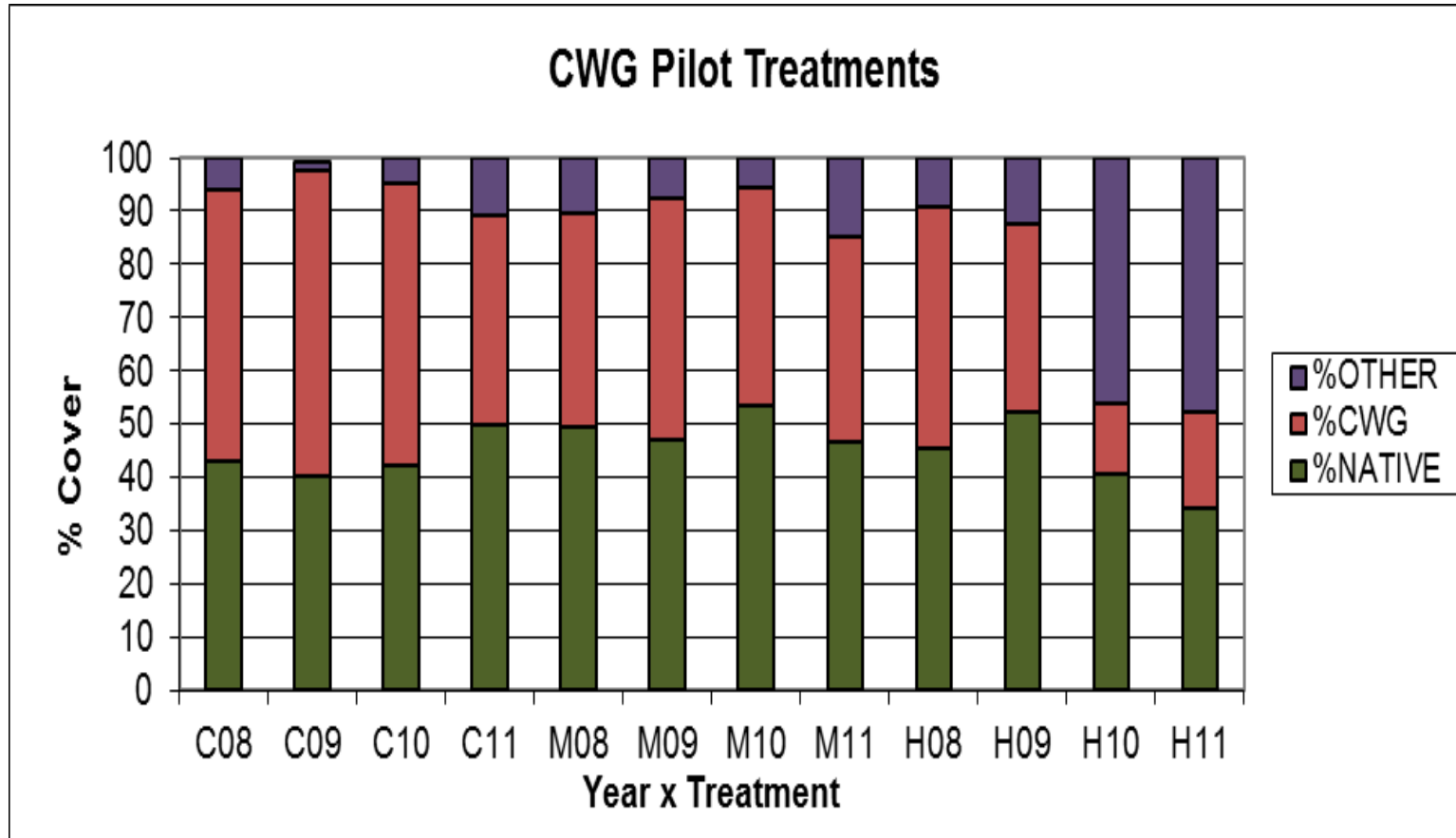
Benton Lake National Wildlife Refuge

Figure 1. 2011 Crested Wheatgrass Pilot



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Figure 3. Baseline vegetation composition of belt transects placed at the invasion front for two treatments and control (C=Control plots; M=Mowed plots and H=Herbicide treated plots).



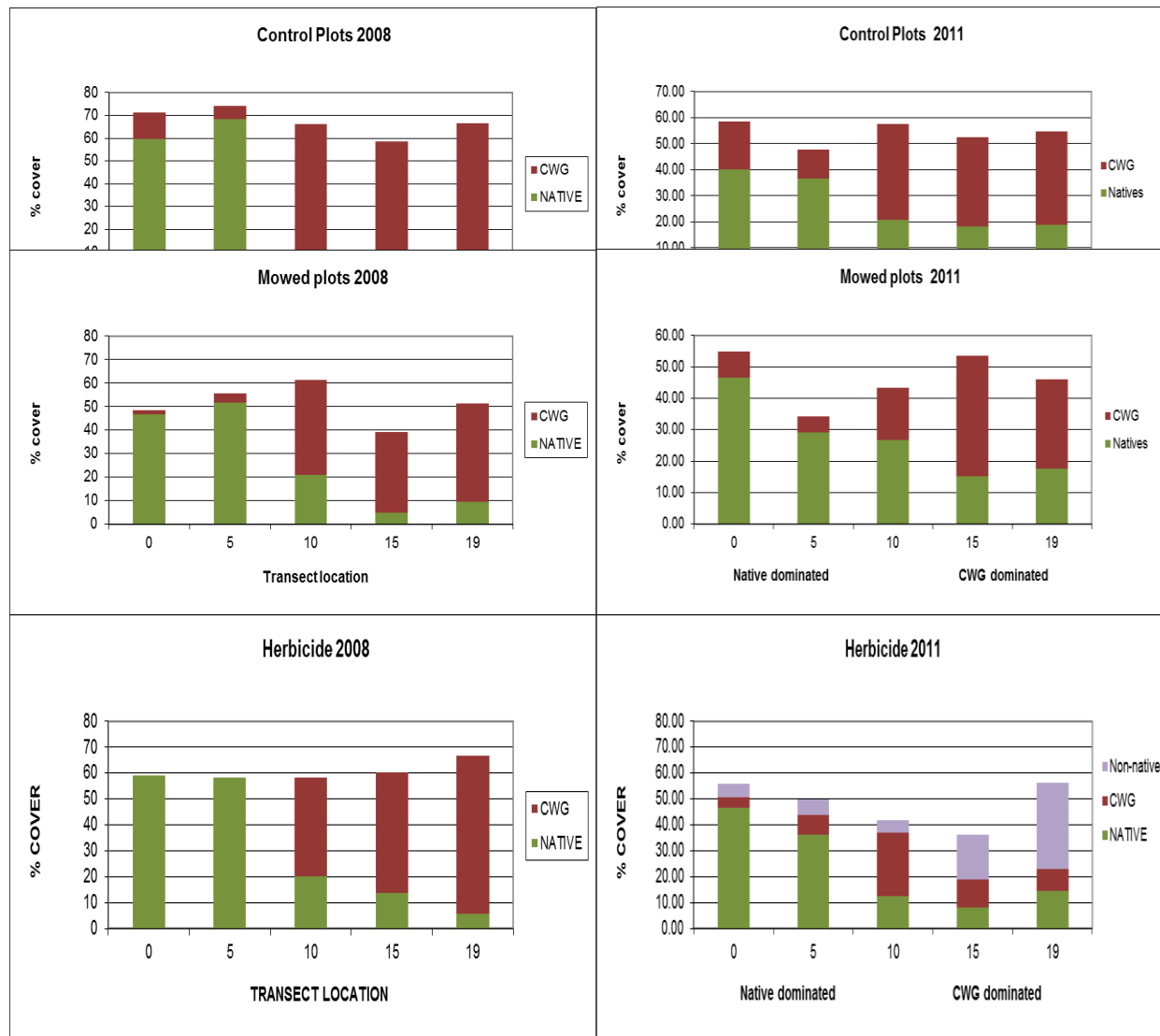


Figure 4. Changes in percent cover within transects (2008 left, 2011 right).